PATENT
5867-00900

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Serial No. 10/791,085
Confirmation No. 2933

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12/08/2006 /Pamela Gerik/
Date Pamela Gerik

APPEAL BRIEF

Sir/Madam:

Further to the Notice of Appeal filed October 11, 2006, Appellant presents this Appeal Brief. The Notice of Appeal was filed following receipt of a final Office Action mailed July 11, 2006. Appellant hereby appeals to the Board of Patent Appeals and Interferences from the rejection of and/or objection to pending claims 1-24 and respectfully requests that this appeal be considered by the Board.

I. REAL PARTY IN INTEREST

The subject application is owned by Motion Computing, Inc. as evidenced by the assignment recorded at reel 015046 and frame 0197.

II. RELATED APPEALS AND INTERFERENCES

No appeals, interferences, or judicial proceedings are known which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-20 stand rejected, claims 21-24 stand objected to as being dependent upon a rejected base claim, and claims 25-28 were canceled. Claims 1-24 are being appealed.

IV. STATUS OF AMENDMENTS

No amendments to the claims were filed subsequent to their final rejection. Therefore, the Appendix hereto reflects the current state of the claims.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 describes a system for reducing electromagnetic interference between two or more co-located antennas coupled to the system (Specification -- pg. 6, lines 17-20), wherein the system comprises: a first antenna configured for transmitting a first signal within a first frequency band (Specification -- pg. 17, lines 30-34; pg. 18, lines 2-15; Fig. 2); a second antenna configured for operation within a second frequency band during transmission of the first signal (Specification -- pg. 20, lines 4-11; pg. 7, lines 9-13; pg. 21, lines 27-28); and an apparatus arranged between the first and second antennas for intercepting electromagnetic energy radiated from the first antenna during transmission of the first signal (Specification -- pg. 22, lines 1-26; Figs. 4-5), wherein the apparatus is configured for scattering the radiated energy away from the second antenna to reduce electromagnetic interference at the second antenna (Specification -- pg. 28, lines 26-30; pg. 29, lines 1-19; Fig. 6).

Independent claim 16 describes a system for reducing electromagnetic interference between two or more co-located antennas coupled to the system (Specification -- pg. 6, lines 17-20), wherein the system comprises: a pair of antennas spaced apart from one another by a relatively short distance (Specification -- pg. 17, lines 30-34; pg. 18, lines 2-15; Fig. 2), wherein the pair of antennas are configured for operating within a same or nearby frequency band (Specification -- pg. 20, lines 4-11; pg. 7, lines 9-13; pg. 21, lines 27-28); and an apparatus comprising a plurality of elements arranged between the pair of antennas for intercepting

electromagnetic energy radiated from a first antenna of the pair of antennas during transmission of a first signal (Specification -- pg. 28, lines 26-30; pg. 30, lines 16-27; Figs. 7-12;), wherein the apparatus is configured for redirecting the radiated energy away from a second antenna of the pair of antennas to reduce electromagnetic interference at the second antenna (Specification -- pg. 28, lines 26-30; pg. 29, lines 1-19).

The claimed subject matter generally relates to a system for reducing electromagnetic interference between a pair of antennas (Specification -- pg. 6, lines 17-20). The pair of antennas are illustrated as radio antennas or modules 210 and 220 which can be coupled possibly to a wireless communication device 200 (Specification -- Fig. 2). The first antenna 210 can transmit a first signal within a first frequency band, while to second antenna 220 can transmit a second signal within a second frequency band (Specification -- pg. 7, lines 9-19). Each antenna includes a driver such as driver 350 (Specification -- Fig. 3). The radio frequency driver 350 can operate at a "carrier frequency" (Specification -- pg. 21, lines 10-13; Fig. 3). Fig. 1 of the present specification illustrates differing carrier frequencies.

According to one embodiment, the carrier frequency of the first antenna is at, near, or overlaps the carrier frequency of the second antenna. The driver 350 can be configured to operate "at the intended carrier frequency" of 2.4 GHz, with the other driver of the other antenna operating at the same frequency band or overlapping the same frequency band of 2.4 GHz, for example. The nearby frequencies can be possibly 2.4 GHz to about 2.45 GHz (Specification -- pg. 21, lines 12-15) and when used in the ISM band shown in Fig. 1 of the present specification, a first antenna can be transmitted according to the IEEE 802.11b, while the second antenna can be operated according to Bluetooth™ protocol (Specification -- Fig. 1; pg. 16, lines 16-32; pg. 17, lines 27-28). Accordingly, the present claims describe antennas which transmit in the same frequency band, overlapping frequency bands, or in frequency bands that lie near one another (i.e., between 2.4-2.45 GHz, for example).

To reduce electromagnetic interference caused by the antenna pair transmitting within the same or nearly the same frequency band, an apparatus is arranged between the antenna pairs. The apparatus is described as one which does not reduce power efficiency or increase the

"insertion loss" at the transmission frequency of interest (Specification -- pg. 22, lines 1-26). For example, "[i]n some cases, the total power loss may be as much as 75% when a transmitting antenna is placed in the vicinity of electrically-conductive external surface 230" (Specification -- pg. 23, lines 17-20; Fig. 2). The term "interference" can "be quantified by measuring the insertion loss between the transmitting antenna and a nearby antenna" (Specification -- pg. 23, lines 30-31). A conductive device placed near a transmitting antenna will increase the insertion loss at the frequency band of interest (Specification -- Figs. 4-5). "[A]n insertion loss of -10 dB can produce enough interference to significantly impair radio operations" (Specification -- pg. 24, lines 25-26). To reduce insertion loss, it is important that the conductive devices placed near a transmitting antenna be minimized if such conductive devices absorb the transmitted frequency band through, for example, a ground plane attached to the conductive device. The increased insertion loss demonstrates itself as an inappropriate C/I ratio (Specification -- pg. 25, lines 1-26).

Instead of grounding the apparatus arranged between the pair of antennas, it is beneficial to allow such an apparatus to resonate. "[A]pparatus 270 generally functions as a 'passive resonator,' meaning that it resonates (or re-radiates) the electromagnetic energy intercepted from a relatively close radiative source (such as radio module 210)" (Specification -- pg. 28, lines 26-30; Fig. 6). Keeping the apparatus free from and not coupled to a ground supply allows the apparatus to radiate, thereby scattering the radiated energy from a first antenna away from a second antenna or vice-versa (Specification -- pg. 29, lines 1-19). Scattering of radiated energy is the antithesis of absorbing radiated energy. Moreover, scattering radiated energy minimizes the insertion loss that would normally be attributable to absorption.

There are many different configurations for the claimed apparatus used for scattering the radiated energy. In a generic sense, the apparatus "comprises a plurality of elements" (Specification -- pg. 30, lines 16-27). The different arrangements of the plurality of elements and those configurations are described and illustrated throughout the originally filed specification. *See* Figs. 7-12 of the present specification. Each of the plurality of elements can be used to establish its own specific resonant circuit, with a capacitive portion and an inductive portion (Specification -- pg. 31, lines 1-33). The dimensions of the pattern of elements can be

chosen based on, for example, the wavelength of the transmitted circuit (Specification -- pg. 33, lines 10-26). Each of the plurality of elements can be configured as its own resonating circuit, with differing dimensions to allow a different resonating frequency should the transmitting frequency of the transmitting antenna change (Specification -- pg. 35, line 28 - pg. 36, line 29).

Throughout the claimed subject matter, reference is made to scattering of radiated energy and the benefits of doing so without absorbing the carrier frequency and incurring insertion loss or reduction in transmitting efficiency. Reference is also made to the apparatus and its varying configuration that utilizes a plurality of elements for more efficiently scattering the radiated energy at the various resonating frequencies of the transmitting signal. Yet further, reference is made to the pair of antennas transmitting at the same frequency band and overlapping frequency band, or nearly the same frequency band (e.g., within 2% of each other, i.e., 1 - 2.4/2.45 GHz).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1-9 and 16 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2005/0041624 to Hui et al. (hereinafter "Hui").

2. Claim 10 stands rejected under 35 U.S.C. § 103(a) as being unpatentable Hui in view of U.S. Patent No. 6,752,320 to Herranen (hereinafter "Herranen").

3. Claims 11-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hui in view of U.S. Patent No. 6,654,231 to Teshima (hereinafter "Teshima").

4. Claims 17-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hui in view of U.S. Patent No. 5,905,467 to Narayanaswamy et al. (hereinafter "Narayanaswamy").

5. Claims 21-24 were objected to as being dependent upon a rejected base claim.

VII. ARGUMENT

The contentions of the Appellant with respect to the ground of rejection presented for review, and the basis thereof, with citations of the statutes, regulations, authorities, and parts of the record relied upon are presented herein for consideration by the Board. Details as to why the rejections cannot be sustained are set forth below.

Rejection of Claims 1-9 and 16

Claims 1-9 and 16 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2005/0041624 to Hui et al. (hereinafter "Hui"). The standard for "anticipation" is one of fairly strict identity. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art of reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP 2131. Furthermore, anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, as arranged in the claim. *W.L. Gore & Assocs. V. Garlock*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983). Using these standards, Applicants submit the cited art fails to disclose each and every element of the currently pending claims, some distinctive features of which are set forth in more detail below.

Hui does not teach or suggest an apparatus for scattering radiated energy. Independent claim 1 defines an apparatus arranged between first and second antennas. The apparatus intercepts electromagnetic energy from the first antenna during transmission of a first signal from that antenna. The apparatus is configured for scattering the radiated energy away from the second antenna.

The final Office Action alleges that Hui includes an apparatus for scattering radiated energy. The final Office Action points to ¶ [0069] of Hui for the proposition that it teaches scattering of radiated energy. Appellants respectfully disagree. In the named ¶ [0069] Hui states that "Fig. 8 illustrates a portion of the PWB 110 further comprising a firewall 810." Unfortunately, Appellants find no reference 810 illustrated in Fig. 8 of Hui. However, Hui

describes in ¶ [0069] that "firewall 810 is configured as a conductive trace (e.g., copper) of suitable length . . . with one end connected to ground and the other end left open, and formed between two antennas to reduce antenna mutual coupling." Specifically, Hui describes the firewall as a conductive trace with one end connected to ground. The open end is formed between the two antennas and the grounded end absorbs electromagnetic energy radiated from an interfering transmitting antenna, conveys the electromagnetic energy through the firewall to the ground supply at the other end. By absorbing the radiated interference, firewall 810 prevents the antenna radiation from being "re-radiated via the GPS [other] antenna 400" (Hui -- ¶ [0069]).

As described in the present specification, there are two mechanisms in which to reduce the interference between a pair of closely spaced antennas. One mechanism would be to absorb the radiated energy from one antenna before it reaches the other antenna. The mechanism, however, will increase the insertion loss and decrease the overall transmission efficiency of the transmitting antenna to its destination or target. The other mechanism in which to reduce interference between a pair of antennas is to scatter the radiated energy away from the other antenna. By scattering the radiated energy (rather than absorbing) the transmitting energy is redirected away from the other antenna and toward to destination or target. This will decrease the insertion loss and increase the overall transmitting efficiency of the antenna. By purposely grounding a firewall placed in proximity to a transmitting antenna, the firewall will "decrease scatter electromagnetic interference" (Hui -- ¶ [0080]) and "reduce interference indicative of an antenna reflections" (Hui -- ¶ [0088]).

Hui does not teach or suggest a first antenna transmitting within a first frequency band, a second antenna transmitting within a second frequency band, and at least a portion of the second frequency band overlapping the first frequency band (claim 2), or the pair of antennas operating within the same or nearly the same frequency band (claim 16). Dependent claim 2 and independent claim 16 each recite the pair of antennas transmitting within the same band, within an overlapping band of each other, or within separate bands near one another. The term "near" is defined in the present specification to be less than 2% according to one example.

Instead of, for example, transmitting from the pair of antennas at a band centered at 2.4 GHz, Hui specifically describes a dual band CDMA antenna system. The CDMA antenna includes an IFA antenna 200 and a loop antenna 300 (Hui -- Figs. 2-3). Hui continues by explaining that an IFA antenna transmits cellular information at approximately 850 MHz and the loop antenna transmits personal computer services (PCS) information at 1900 MHz (Hui -- ¶¶ [0007] and [0012]-[0013]). The firewall 810 can be placed between the IFA antenna and the loop antenna, each of which are transmitting at quite dissimilar frequency bands (i.e., 850 MHz and 1900 MHz). Certainly, the dual banded CDMA antenna system of Hui does not contemplate and certainly does not anticipate the claimed first and second antennas transmitting at the same frequency band, overlapping frequency band, or nearly the same frequency same. Even if the IFA antenna is removed and replaced with a GPS antenna, it is recognized in Hui that a GPS antenna transmits at 1600 MHz, still quite dissimilar from the other antenna (IFA antenna transmitting at 850 MHz or loop antenna transmitting at 1900 MHz). Regardless, it is impossible for the <u>titled</u> dual band system of Hui to operate as a single band system with dual antennas transmitting at the same, overlapping, or nearly the same frequency band as presently claimed.

Hui does not teach or suggest an apparatus comprising a plurality of elements for intercepting electromagnetic energy and redirecting the radiated energy. Present independent claim 16 describes a particular configuration for an apparatus, wherein the apparatus comprises a <u>plurality of elements</u>, such as elements 710 (Figs. 7A-7F), elements 1010 (Figs. 10A-10C, or elements 1110 (Figs. 11A-11C). While Hui may suggest absorbing energy to a ground supply, Hui specifically requires a single conductive trace for doing so (Hui -- ¶ [0069]). The single conductive trace has opposing ends, with one end open and the other coupled to ground (Hui -- ¶ [0069]). There is no suggestion in Hui that a plurality of elements can be used, whether those elements are arranged linearly or in an array, nor is there any suggestion of using multiple elements to redirect radiated energy.

For the foregoing reasons, Appellant asserts that independent claims 1 and 16 are not anticipated by Hui. In addition, Appellant asserts that dependent claims 2-9 are not anticipated by Hui for at least the same reasons as their base claim 1. Although not rejected under § 102 and

addressed below, Appellant also asserts that dependent claims 10-15 and 17-24 are not anticipated by Hui for at least the same reasons as their respective base claims 1 and 16.

Rejection of Claim 10

Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hui in view of Herranen. As discussed above, Appellants assert that independent claim 1 from which claim 10 depends is patentably distinct over Hui. Therefore, Appellant asserts that dependent claim 10 is patentably distinct over Hui and/or the combination of Hui and Herranen for at least the same reasons as its base claim 1.

Rejection of Claims 11-15

Claims 11-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hui in view of Teshima. As discussed above, Appellants assert that independent claim 1 from which claims 11-15 depend is patentably distinct over Hui. Therefore, Appellant asserts that dependent claims 11-15 are patentably distinct over Hui and/or the combination of Hui and Teshima for at least the same reasons as their base claim 1.

Rejection of Claims 17-20

Claims 17-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hui in view of Narayanaswamy. As discussed above, Appellants assert that independent claim 16 from which claims 17-20 depend is patentably distinct over Hui. Therefore, Appellant asserts that dependent claims 17-20 are patentably distinct over Hui and/or the combination of Hui and Narayanaswamy for at least the same reasons as its base claim 16.

Objection to Claims 21-24

Claims 21-24 were objected to as being dependent upon a rejected base claim. As discussed above, Appellants assert that independent claim 16 from which claims 21-24 depend is patentably distinct over Hui. Therefore, Appellant asserts that dependent claims 21-24 are allowable in their present form for at least the same reasons as its base claim 16.

* * *

For the foregoing reasons, it is submitted that the Examiner's rejection of and objection to pending claims 1-24 was erroneous, and reversal of the Examiner's decision is respectfully requested.

The Commissioner is hereby authorized to charge the required fee(s) or credit any overpayment to Daffer McDaniel, LLP deposit account number 50-3268.

Respectfully submitted,
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KLD

VIII. APPENDIX

The present claims on appeal are as follows.

1. A system for reducing electromagnetic interference between two or more co-located antennas coupled to the system, wherein the system comprises:

a first antenna configured for transmitting a first signal within a first frequency band;

a second antenna configured for operation within a second frequency band during transmission of the first signal; and

an apparatus arranged between the first and second antennas for intercepting electromagnetic energy radiated from the first antenna during transmission of the first signal, wherein the apparatus is configured for scattering the radiated energy away from the second antenna to reduce electromagnetic interference at the second antenna.

2. The system of claim 1, wherein at least a portion of the second frequency band overlaps the first frequency band.

3. The system of claim 1, wherein the apparatus is positioned proximate to the second antenna.

4. The system of claim 1, wherein the apparatus is positioned proximate to the first antenna.

5. The system of claim 1, wherein the apparatus is further configured for intercepting electromagnetic energy radiated from the second antenna during transmission of a second signal, scattering the radiated energy away from the first antenna, and reducing electromagnetic interference at the first antenna.

6. The system of claim 1, wherein the system comprises any computing and/or telecommunications system capable of transmitting and/or receiving audio, video and/or data signals over a wireless medium.

7. The system of claim 6, wherein the computing and/or telecommunications system is selected from a group comprising a server, a desktop computer, a notebook computer, a tablet computer, a hand held organizational and/or computational device, a mobile telephone, or a combination thereof.

8. The system of claim 1, wherein the system comprises any personal or public transportation system having at least two radio modules coupled thereto for transmitting/receiving signals via the first and second antennas.

9. The system of claim 1, wherein the first antenna, the second antenna and the apparatus are coupled to internal components of the system and surrounded, at least in part, by a substantially non-conductive external surface.

10. The system of claim 9, wherein the first antenna, the second antenna and the apparatus are integrated onto an expansion card or sub-assembly, which is detachably coupled to the internal components of the system.

11. The system of claim 1, wherein the first antenna, the second antenna and the apparatus are coupled to an external surface of the system, and wherein the external surface is configured for supporting and/or encasing internal components of the system.

12. The system of claim 11, wherein a majority of the external surface is formed from an electrically conductive material.

13. The system of claim 11, wherein at least a portion of the external surface is formed from a substantially non-conductive material in the immediate vicinity of the first and second antennas and the apparatus.

14. The system of claim 11, wherein the first antenna, the second antenna and the apparatus are coupled to the external surface on one side or on different sides of the system.

15. The system of claim 11, wherein the apparatus is arranged between the first and second antennas and coupled to a substantially non-conductive covering that connects to the external surface for protecting and/or concealing the first and second antennas.

16. A system for reducing electromagnetic interference between two or more co-located antennas coupled to the system, wherein the system comprises:

a pair of antennas spaced apart from one another by a relatively short distance, wherein the pair of antennas are configured for operating within a same or nearby frequency band; and

an apparatus comprising a plurality of elements arranged between the pair of antennas for intercepting electromagnetic energy radiated from a first antenna of the pair of antennas during transmission of a first signal, wherein the apparatus is configured for redirecting the radiated energy away from a second antenna of the pair of antennas to reduce electromagnetic interference at the second antenna.

17. The system of claim 16, wherein the relatively short distance between the first and second antennas is dependent on a wavelength of the first signal and a dimension of a surface upon which the antennas are coupled to the system.

18. The system of claim 17, wherein the first and second antennas are positioned along the dimension near opposite ends of the surface to maximize the relatively short distance therebetween.

19. The system of claim 18, wherein the dimension of the surface is less than or equal to about 1 m.

20. The system of claim 19, wherein the electromagnetic energy radiated from the first antenna propagates through free space as a plane wave having minimum and maximum electromagnetic energy levels at various locations along the surface, wherein the various locations correspond to fractional amounts of the wavelength of the first signal, and wherein a receiving end of the second antenna is positioned at a location of minimum electromagnetic energy.

21. The system of claim 20, wherein a center of the apparatus is positioned proximate to the second antenna at the location of maximum electromagnetic energy.

22. The system of claim 20, wherein a center of the apparatus is positioned proximate to the first antenna at the location of maximum electromagnetic energy.

23. The system of claim 22, wherein the apparatus provides an insertion loss of about –25 dB to about –35 dB when the receiving portion of the second antenna is positioned approximately one wavelength away, and the center of the apparatus is positioned approximately ¼ wavelength away, from a transmitting portion of the first antenna.

24. The system of claim 23, wherein the insertion loss is provided over a wide range of band-gap frequencies including any carrier frequencies used by the first and second antennas and extending from a) the lowest carrier frequency used by the first and second antennas to b) approximately two to four octaves above the lowest carrier frequency.

IX. <u>EVIDENCE APPENDIX</u>

No evidence has been entered during the prosecution of the captioned case.

X. RELATED PROCEEDINGS APPENDIX

No prior or pending appeals, interferences, or judicial proceedings are known to Appellant or Assignee which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.